Hydrology and Hydraulics

Occurrence and Movement of Water

Why do We Care About Water?

- ***It's 2/3 of our Bodies & covers 2/3 of our Planet***
- ***Where is most of this Water?***
  - **97.2% Oceans - 320 million cubic miles of water**
  - **2.15 % Ice Caps and Glaciers –**
  - **The Antarctic Ice Sheet is 6 million sq miles and 1000 ft thick. 7 million cubic miles of Frozen Water. That more water than all the rivers in the world flowing for 750 years**
  - **1% Freshwater – Streams, Rivers, Lakes and Groundwater**
  - **Less than 0.1% is accessible to humans**

Water Vs No Water

Why is water Important to USA

Navigation

OHIO
Beaver River
East Brady
9
8
7
Kittanning
6
5
4
3
2
Allegheny River
Montgomery
East Liverpool
New Cumberland
Dashields
Emsworth
Pittsburgh
2
3
4
Steubenville
Pike Island
Locks and Dams in the Pittsburgh District
Monongahela River
Ohio River
Wheeling
Maxwell
Brownsville
Moundsville
Grays Landing
Point Marion
PA
Hannibal
New Martinsville
Morgantown
Hildebrand
Opekiska
Fairmont
W. VA.
MD.

Water POWER

Hydropower

Water Supply

Dangers of Living Near Water?

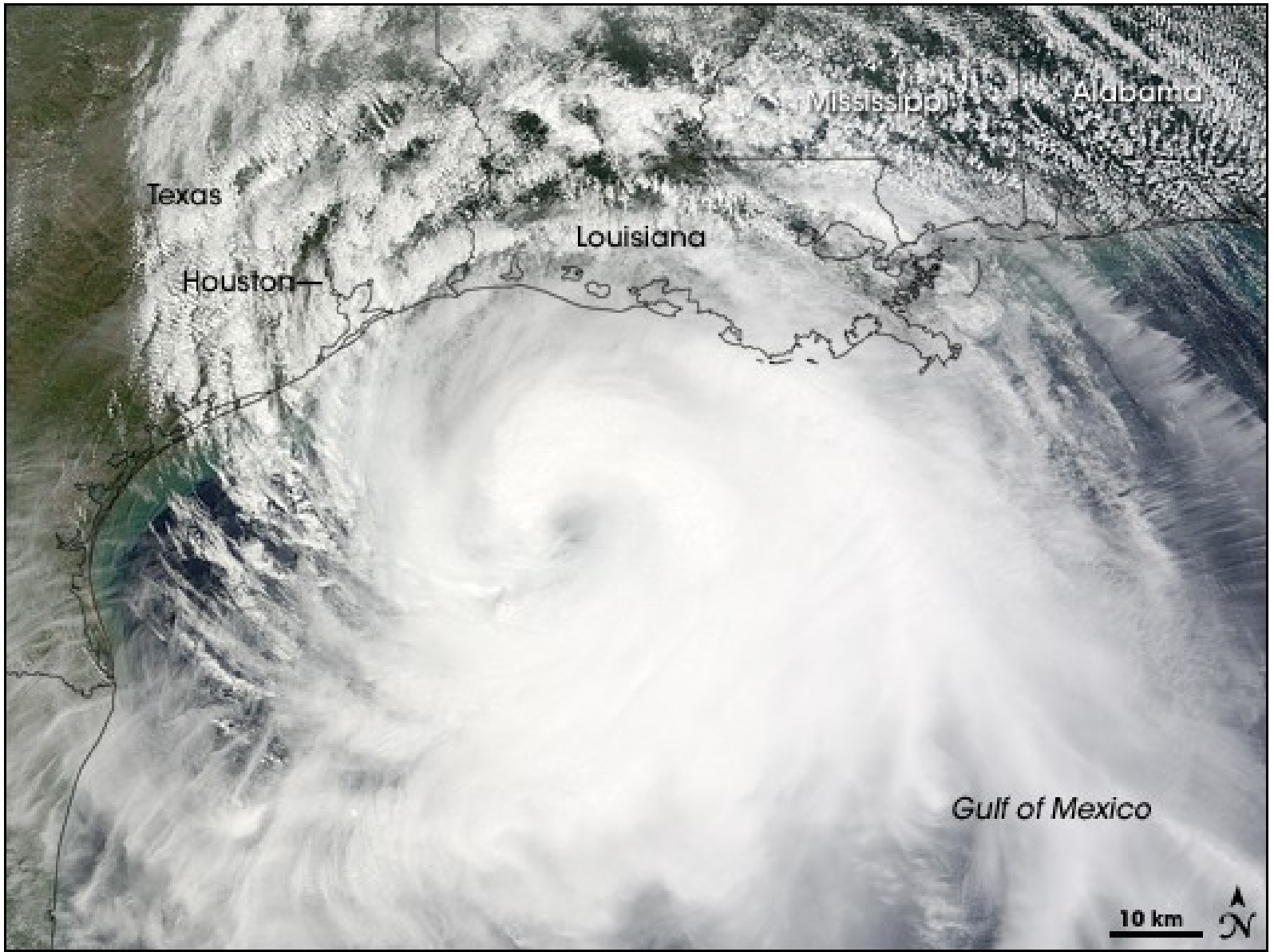
A Flood is?

Urban Flooding

http://www.youtube.com/watch?v=kYUpkPTcqPY

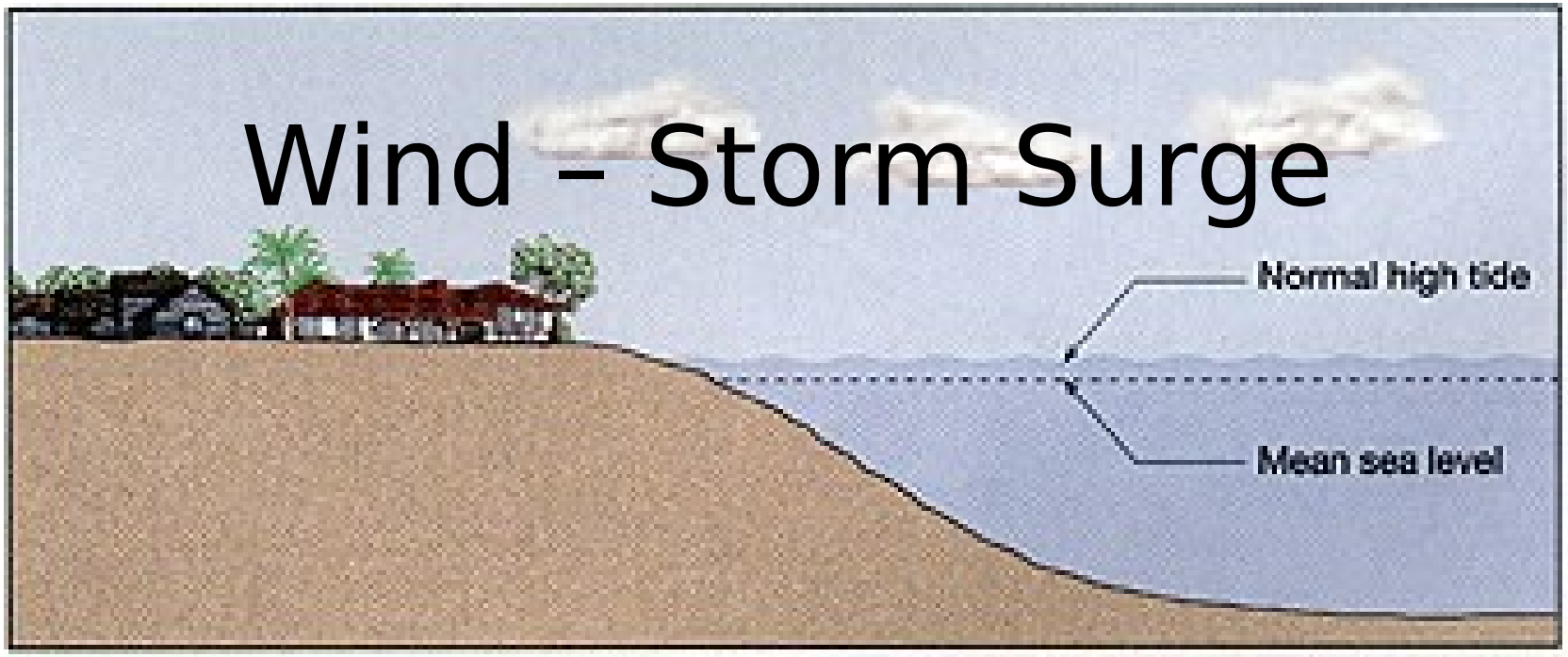
What Causes Floods?

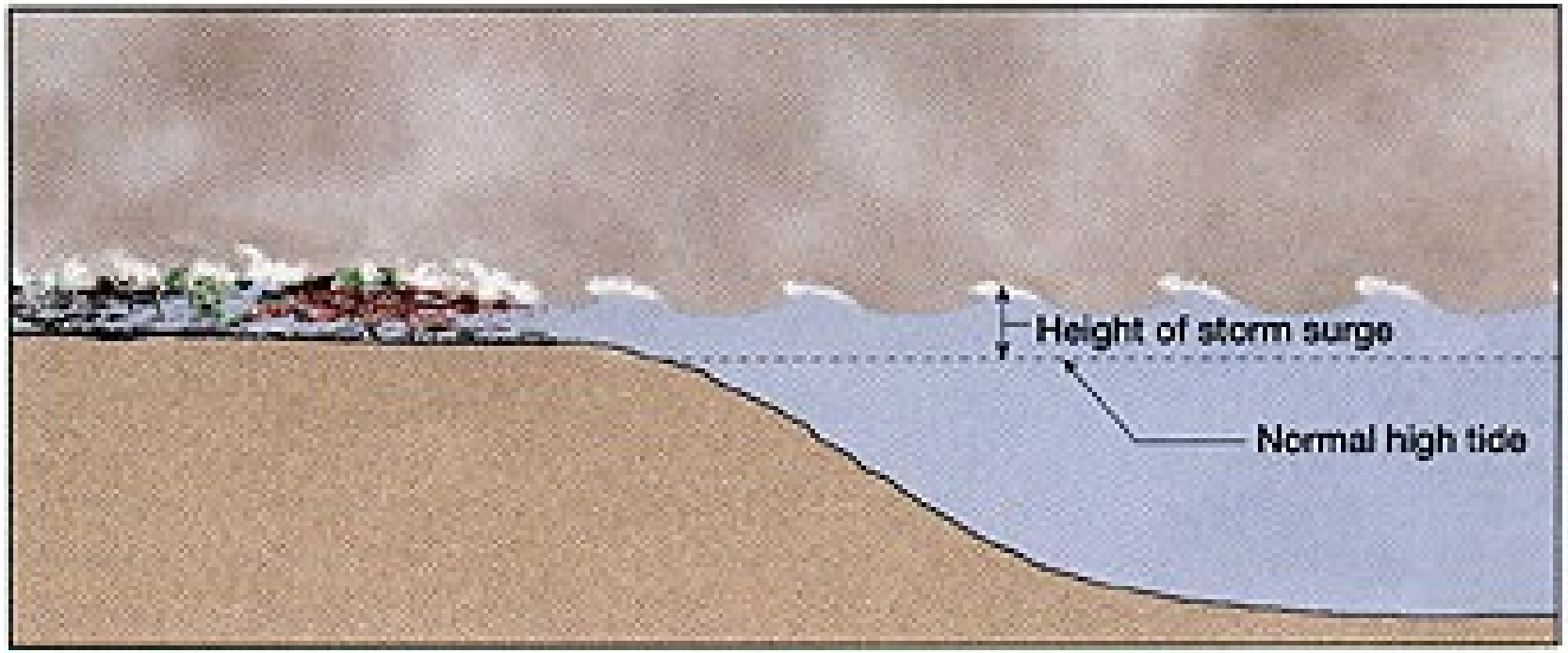
Hurricane IKE



Wind

Wind – Storm Surge





IKE Gilchrist TX

ICE JAMS

Volcanos

USGS

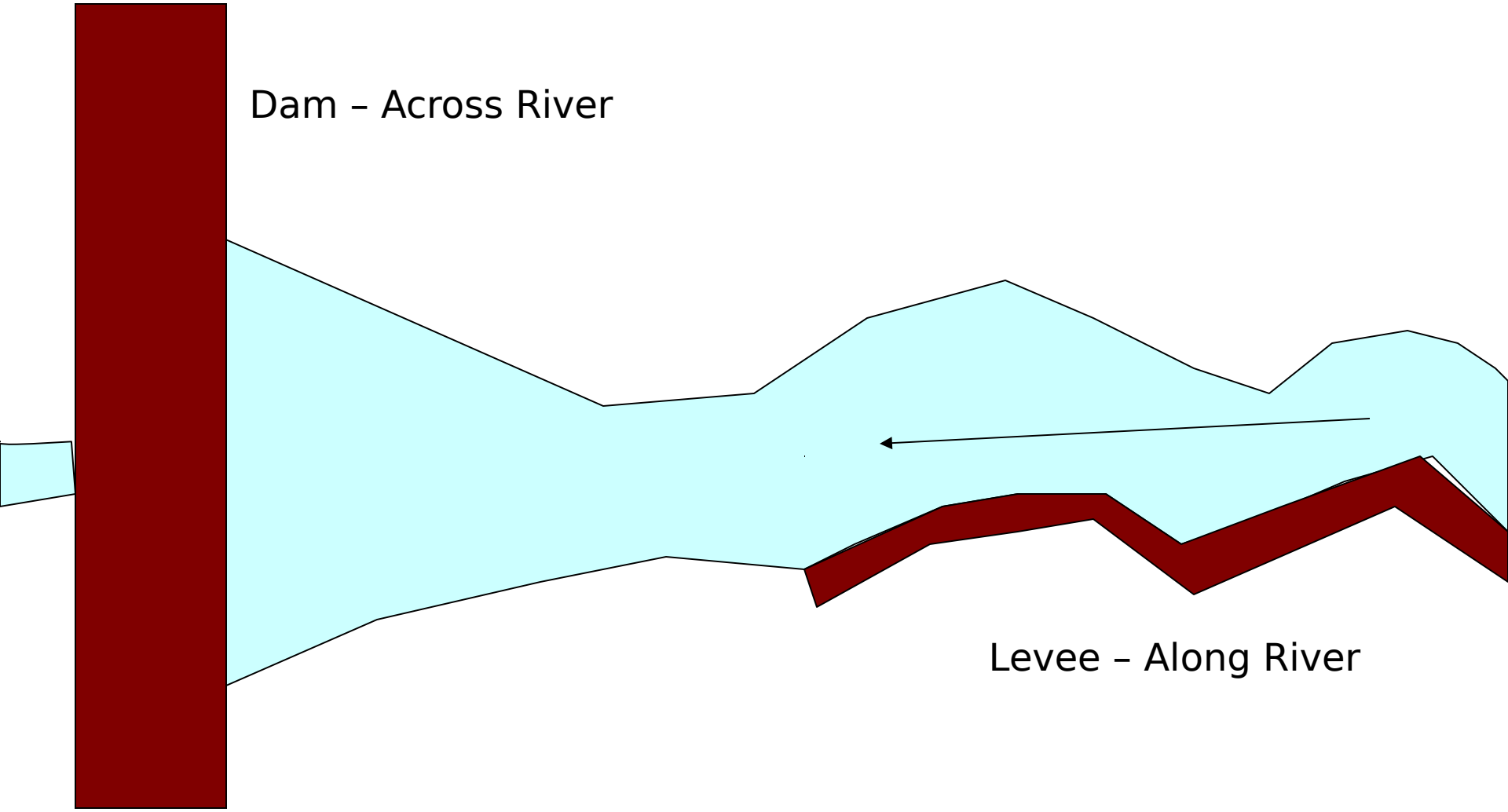
Tsumanis- Earthquake & Volcanoes

10 Deadliest Indian Ocean Tsunamis

Date	Source	Deaths
26 Dec 2004	Sumatra	225000
27 Aug 1883	Java/Sumatra	36500
26 Jun 1941	Andaman Sea	5000
3 Sep 1861	Sumatra	1700
16 Jun 1819	Arabian Sea	1543
28 Nov 1945	Arabian Sea	1000+
16 Feb 1861	Sumatra	905
2 Apr 1762	Bay of Benga	l500
19 Aug 1977	Sunda Islands	500
4 Jan 1907	Sumatra	400

How Can You Lessen Floods?

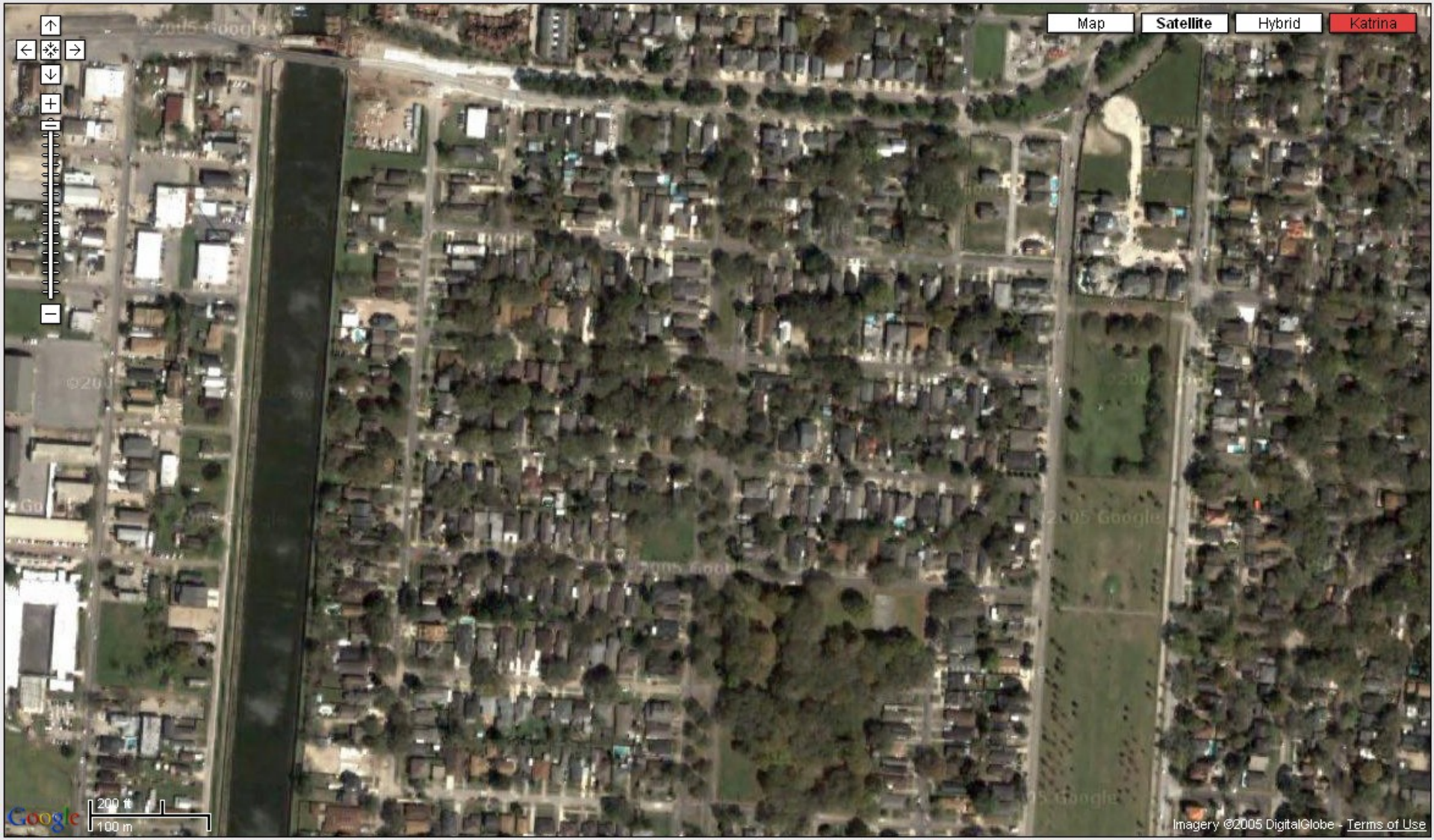
Levee or Dam?

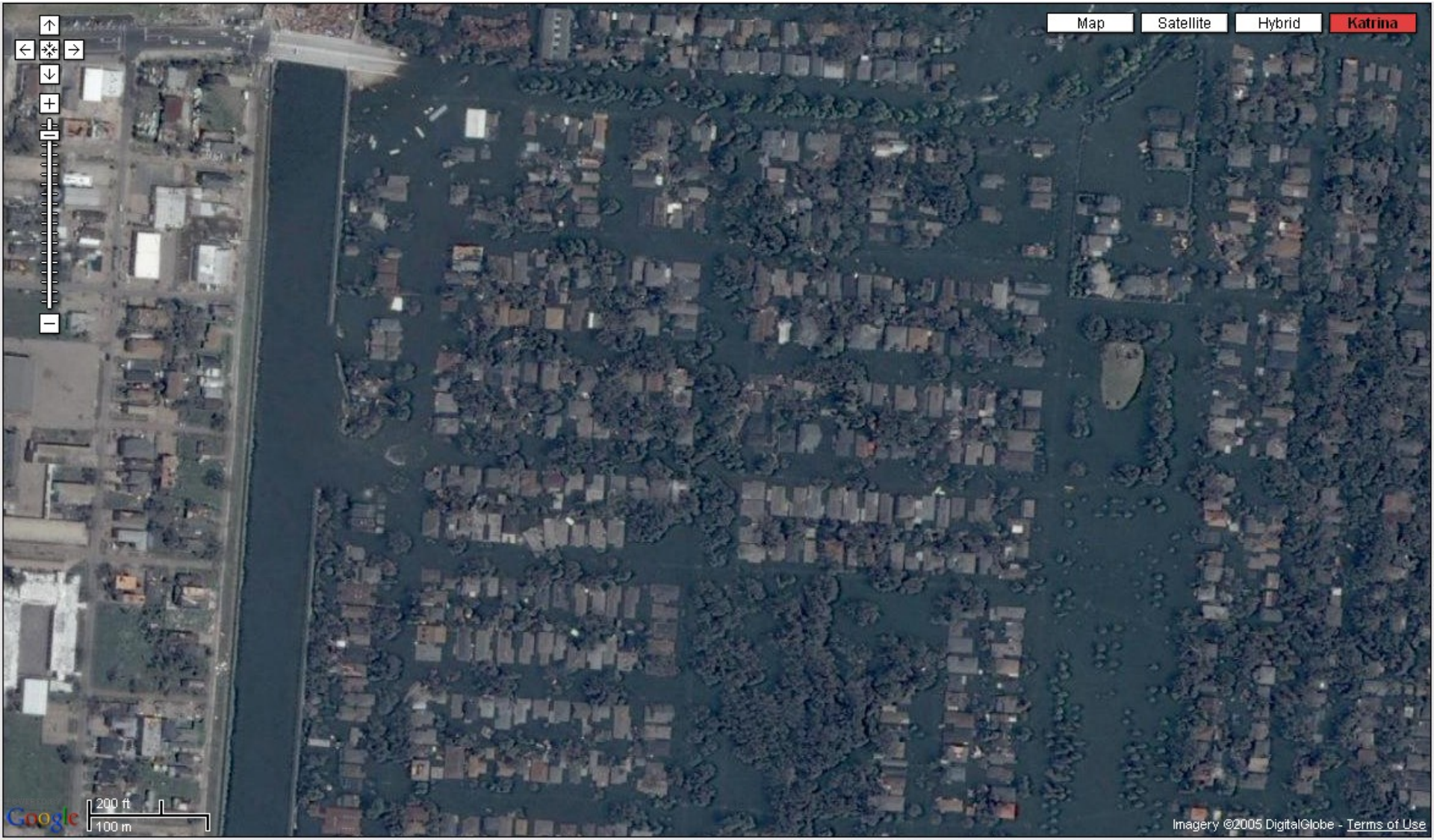


Structural Failure - Dams

Developed Conditions

Structure Failure - Levees




Map
Satellite
Hybrid
Katrina
200 ft
100 m
Google
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10.02.2005

10.26.2005

10.04.2005

We Protect People from Water And Water from People

03.21.2006